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## The Hearings According to Chairman John Dingell

*Though he has long been a great power on Capitol Hill, Rep. John D. Dingell (D-Mich.) drew little notice from the scientific community until last year, when he chaired hearings on the misfortunes of a former MIT postdoc, Margot O'Toole, who challenged a paper coauthored by Nobelist David Baltimore, Director of the Whitehead Institute for Biomedical Research, at MIT. And thus began what has come to be known as the Baltimore case, for which Dingell has been widely reviled as an enemy of science (SGR, May 15, June 1). The gruff, super-self-confident Dingell discussed the case with SGR Editor Greenberg on June 8. Following is the text, transcribed and edited by SGR.*

**SGR.** You've got a lot of scientists and their friends upset about the Baltimore inquiry.

**Dingell.** I don't think they understand what we're doing. Our basic concern is not setting up some kind of thought police, or anything of that kind, to police the scientific community. We would like the scientific community to police itself—for the individual researcher to review his behavior, his work. And for the peers to review the behavior of the persons whose work they're examining. I don't think there's anything improper in that kind of inquiry.

**SGR.** The scientific response would be that they do police themselves.

### **The Aging of American Science—P. 7 A Roster of US Science Attaches—P. 5**

**Dingell.** I've seen some comments that indicate they don't and that in this particular case, they did not. And the interesting thing about peer review is that it deals with scientific plans or results; it doesn't deal with fraud or serious misbehavior.

**SGR.** You've suggested that though scientists don't realize it now, the experience of the Baltimore hearing will really be beneficial for science.

**Dingell.** It will be if the scientists choose to make it so.

**SGR.** You possess certain powers to encourage them to make it so.

**Dingell.** We try to be helpful when we can.

**SGR.** In what way has the performance of the scientific establishment been deficient in the Baltimore case?

**Dingell.** First of all, this is not the Baltimore case. Second of all, we have never really focused on Dr. Baltimore. Dr. Baltimore chose to make himself the focus of the question, despite our best efforts to the contrary. We are interested in a number of events. First, the treatment of Dr. O'Toole [the postdoctoral fellow who questioned the valid-

ity of a paper in *Cell* coauthored by Baltimore]. Second, a number of allegations that were made by Dr. O'Toole. Third, the response of [Thereza] Imanishi-Kari [a coauthor of the disputed *Cell* paper] to the questions raised by Dr. O'Toole. Fourth, the questions of peer review that were associated with it. Was there a real peer review here, or was it something else?

**SGR.** Peer review of the paper or of her allegations?

(Continued on Page 2)

## In Brief

William R. Graham, the holdover Director of the White House Office of Science and Technology Policy (OSTP), quietly stepped down on June 5 and has gone to work as a Senior Vice President in the suburban Washington office of Jaycor Corp., a defense firm headquartered in San Diego. OSTP Deputy Director Thomas P. Rona is filling in as Acting Director.

Meanwhile, Bush's choice to succeed Graham, D. Allan Bromley, of Yale, has come through the White House clearance maze that's holding up hundreds of senior federal appointments. With the FBI satisfied that Bromley is okay, and his financial affairs deemed appropriate for federal office holding, the nomination was formally delivered to the Senate Commerce, Science, and Transportation Committee on June 6—nearly seven weeks after the White House announced his selection. A date has not been set for a confirmation hearing.

The National Academy of Sciences was a leader in reestablishing scholarly relations with China after the Cultural Revolution. Following the Tiananmen Square massacre, the NAS moved quickly to put its China ties on hold. Expressing "outrage and sadness" in a telex June 5 to the Chinese Academy of Sciences, NAS President Frank Press suspended an exchange program that annually involved about 100 persons. Also suspended was a program that sends a similar number of American specialists for short visits to Chinese universities.

The Federal Technology Transfer Act of 1986 was designed to encourage federal labs to seek commercial uses for their R&D, which consumes about \$25 billion a year. It's plain that the labs have a long way to go. A General Accounting Office survey, reported June 1 to the House Science, Space, and Technology Committee, found that from 1986-88, the 12 agencies that account for virtually all federal R&D spending collected \$4.6 million in royalties. And \$3.9 million of that sum went to the National Cancer Institute for drugs developed under pre-1986 agreements with industry.

## ... Dingell: "I Was Extraordinarily Restrained"

(Continued from Page 1)

**Dingell.** Both. Our views and comments have not been without sympathetic response from fairly responsible parts of the scientific community. There's a letter from Linus Pauling to O'Toole. There have been some fairly sensible and, I thought, responsive comments in the scientific press. Dr. Baltimore and Dr. Imanishi-Kari have indicated that we have charged them with fraud. We've never. We have asked questions and we made some very factual statements about changes in the way the notes and papers were kept in the course of the process.

There have been statements made that we were seeking to deal with the validity of the findings of the study. That is totally at variance with fact. The statements have been made that we were essentially reviewing her work and that sort of thing. In point of fact, we were not.

**SGR.** There was an article in the *Boston Globe* [April 10, 1988] in which one of your staff people is quoted as saying, "It's hard to tell if it's error or fraud."

**Dingell.** There was no charge of fraud. Baltimore raised the issue at the hearing, but it was not a matter of which I wished to quarrel at the time. We have no real purpose in going into the scientific matters. There were some allegations made, for example, that every one of the findings of the study have been replicated. In point of fact, that statement is not true. That includes some of the important and the central ones. There were a number of other statements made that documents associated with the notebook were correct. The Secret Service spoke to those matters better than I can. And the record [of the hearing] contains that kind of information.

I think that when you look at the balance of the thing, we had a rather calm and reasoned hearing. As a matter of fact, my behavior, I thought, was extraordinarily restrained, given the allegations that were made about behavior of the staff and myself.

**SGR.** What is the object of this inquiry?

**Dingell.** It's part of an ongoing series of inquiries the Committee is making into a number of matters relative to expenditures of public monies at NIH.

**SGR.** What else are you looking into at NIH?

**Dingell.** We've been looking at NIH for years. Our Committee has jurisdiction over it, and continued oversight over NIH. We constantly get bills to set up new institutes out there. We look to see to it that these new institutes, which essentially are slicing a small baloney thinner and thinner, don't impair the functions of the existing institutes and don't diminish the actual substantive work by setting up additional bureaucracies. We are looking at a couple other [To Michael F. Barrett, Chief Counsel and Staff Director, Subcommittee on Oversight and Investigations]. What are those?

**Barrett.** We're looking into this Tseng case [involving Scheffer C.G. Tseng, formerly of the Harvard-affiliated Massachusetts Eye and Ear Infirmary, accused of financially profiting from exaggerated claims for an eye drug].

We've looked at Duke [on an unspecified matter], but we've certainly made no decisions on Duke.

**SGR.** This is the first recent inquiry that is looking into the possibility of wrongdoing or subpar performance at NIH. New institutes is a bureaucratic and administrative question.

**Dingell.** It's part of the kind of thing we do. For example, another thing we're looking at is the constant pressure with regard to the anti-vivisectionists and that crowd. We had to deal with this Silver Spring monkey case [concerning mistreatment of laboratory monkeys by an NIH contractor]. We were able to address that, I think, in a very responsible way, and to prevent a significant adverse impact on science.

**Barrett.** Nobody had done any [legislative] oversight on NIH since '81 or '82, and that was one of the things that got us to say let's look at NIH overall.

**SGR.** But many scientists feel there's something different about this inquiry into NIH.

**Dingell.** I'm not aware of anything.

**SGR.** Whether or not you are aware, many people do feel there is something different.

**Dingell.** I'm not arguing that they feel this. I'm just saying I'm not aware of any difference. They may feel the difference. I don't happen to feel so.

**SGR.** Are you curious or concerned about the widespread criticism you've received? Your own hometown paper [*Detroit News*] ran an editorial called another "Galileo Trial."

**Dingell.** If you're going to cite the *Detroit News*, I would simply observe to you that I have a bad editorial denouncing me in that paper an average of twice a month, perhaps as much as once a week, sometimes two and three times a week. I have thought very seriously of sending to the *Detroit News* editorial page a subscription to the newspaper so the idiots that write the editorials there could have the privilege of knowing what the newsmen who work for an honest living had to say on the facts of the matter.

**SGR.** We can look elsewhere. From the scientific community, you've had a barrage of letters saying that you are frightening us, you're intruding on the processes of science.

(Continued on Page 3)

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## ... Frightening of Scientists "A Desirable Result"

(Continued from Page 2)

**Dingell.** That may be desirable. If that's the only consequence—we're frightening them—I would say that's probably a desirable result.

**SGR.** They say you don't seem to comprehend the difference between innocent error and fraud.

**Dingell.** We have never made the allegation that there's fraud here.

**SGR.** But it's always been hanging in the wings.

**Dingell.** You won't find any allegations on my part or on the part of any member of the staff of which I'm aware that says there's fraud here.

**SGR.** You don't feel there's any respect at all in which your Subcommittee has overstepped the bounds of Congressional propriety and intruded into the processes of the scientific community?

**Dingell.** No. If the Congress is being charged with that, we entered upon that particular failure years ago when we started financing science so heavily.

**SGR.** The deal years ago was that the government would finance it and keep hands off.

**Dingell.** We are keeping hands off. We are simply inquiring as to whether or not peer review is doing an adequate job. And whether or not monies expended with regard to science are being dealt with properly within the community.

**SGR.** Do you feel that the Baltimore case is representative of a general problem?

**Dingell.** No, I don't think it's representative, although I might say that's probably one of the things into which we're inquiring. We're exploring to see whether the matter was handled properly. We do something on the Subcommittee oftentimes that's a little like what a psychiatrist does. We hold up a mirror and let people look and see. Sometimes they like what they see and sometimes they don't.

**SGR.** If we want to proceed with that metaphor, some people would say that the mirror is distorted.

**Dingell.** We had witnesses under oath.

**SGR.** You apparently are going to proceed with this inquiry.

**Dingell.** We are reviewing what the next step is. We've arrived at no conclusions.

**SGR.** What would satisfy you that you've found what happened and that you know enough to decide whether a legislative response is desirable?

**Dingell.** Well, I don't know. I can only tell you that would be a little bit like beauty or pornography. You might not be able to define it, but you usually know it when you see it. I will tell you that we conduct at a given time 30, 40 investigations. Some of them get to hearings and some of them don't. Some of them have a friendly hearing, some of them have an unfriendly hearing. It depends on the character of it. Sometimes it moves toward legislative results, sometimes it doesn't. I can tell you that on a number of occasions we have inquiries going on for years. Like our inquiries into

safety and security at nuclear facilities. So, we have all kinds of ways of handling these matters.

**SGR.** HHS seems to have taken a preemptive step by setting up the Office of Scientific Integrity at NIH and the Office of Scientific Integrity Review under the HHS Assistant Secretary for Health. Do you think those are satisfactory responses?

**Dingell.** At this particular minute, it appears to be satisfactory. You ought to remember, if you're reviewing what has transpired in connection with this particular case [Baltimore], you will find that it is now reopened at NIH. You will find that there are structural and procedural reforms inside of NIH to deal with this kind of question.

**SGR.** You feel that in that sense, you've had a beneficial effect on NIH?

**Dingell.** We've had a beneficial and responsible effect. We did point out some very significant failures in this matter, including, quite frankly, either the intended or unintended destruction of what appears to have been a very fine young scientist [Margot O'Toole]. Now whether that was intended, deliberate, malevolent, or whether it was just an unintended consequence, I don't know. I've always thought that destroying a human life was a great wrong.

**SGR.** That's putting it a bit strongly—"destroying a human life."

**Dingell.** Would you want to tell me that destroying a career of somebody who spent her entire life preparing to be a scientist is necessarily a desirable consequence?

**SGR.** No, it certainly isn't. But Dr. O'Toole is preparing to resume her career.

**Dingell.** You will notice that it's *after* the hearings by the Committee, and that her employment prior to the hearings of the Committee was somewhat more difficult.

**SGR.** The scientific community has responded with new regulations for dealing with misconduct. Does that suffice?

**Dingell.** I don't know. [To staff member Michael Barrett] Michael, help me with that judgment.

**Barrett.** We're now far enough along. We've seen some stuff happen and we want to see what the longterm benefits of that will be. I don't know if we've made any conclusions so far. We certainly have seen an effort, through the conferences at Cold Spring Harbor [Laboratory, Jan. 26-28, 1988, where a closed meeting of scientists and Congressional staffers was held to discuss the Dingell hearings and related matters; see SGR, Feb. 1, 1989.] And at other places where people are talking about the issues. It sends a signal. People are being made aware that there's a problem.

Remember what we did with accounting [on which Dingell held extensive hearings]. After saying it wasn't a problem, the accounting profession itself undertook their own inhouse cleanup, and they've done a great deal to improve their own policing.

**Dingell.** And there are bigger bucks involved there than

(Continued on Page 4)

## ... "Circling of Wagons Instead of Honest Inquiry"

(Continued from Page 3)

in the scientific business. If you want to deal with the questions that either existed before us or that remain afterwards, let's try and go through some of them. First of all, why was O'Toole treated as she was? And what did she do that was wrong that triggered those kinds of events? Why was it necessary to change dates on notes? Why is the allegation made that the work had been replicated when, in point of fact, it is not?

**Barrett.** Also, why the process is such that the first NIH panel [to investigate O'Toole's allegations] contained conflicts of interest in its makeup? The whole system has been geared to gather around and to protect against criticism.

**Dingell.** We observed here essentially an exercise in circling of the wagons instead of an honest inquiry by the scientists involved. One of the questions that we found to be enormously interesting was the question of when the panel had done its work, why was its report changed by somebody at NIH? We were always told that this was an independent panel. Why was the work of the independent panel changed without knowledge of or consultation with the panel members?

**SGR.** You're referring to the removal of the words of praise for O'Toole?

**Dingell.** Sure. And everyone agreed that those words of praise should remain in the NIH panel's report. Obviously, that [removal] hardly comports with either fact or fair treatment. And why was there not greater procedural fairness afforded to the parties?

**SGR.** Where was there a denial of procedural fairness in responding to O'Toole?

**Dingell.** Read O'Toole's testimony as to what happened to her and then you come and tell me where you find procedural fairness.

**SGR.** MIT and Tufts say they listened to her complaints, took a look, and then decided there wasn't anything to be done about it, but they didn't ignore her.

**Dingell.** They didn't ignore her, but they didn't do anything about it. You will note that both Tufts and MIT have indicated that they propose to make changes in the procedure [for responding to allegations of misconduct]. Now that's a significant change, a significant change for the better. I think that it's important, if science is supposed to be open, that it should really be open. We do not detect the openness here that they profess exists in scientific activity, particularly in the review process that took place inhouse. I detect that that's going to change. And I think that is a process that is going on inside the scientific community at this minute. And that's really what I want.

**SGR.** Do you think it was your Subcommittee's hearings that caused this ferment in the scientific community?

**Dingell.** You're not going to tell me it would have happened if we hadn't held that hearing. It certainly wouldn't have happened, because basically, you have the circling-of-

the-wagons mentality, wherein they all gathered around.

**SGR.** Do you think there was perjured testimony in the hearings?

**Dingell.** I'd have to review the record to see if there was testimony that appeared to vary somewhat from fact. But perjury is a serious statement and I'm not prepared to make that. You've got to understand that there are people who honestly can't remember what the hell went on. I will say that Dr. Imanishi-Kari's memory seemed to be very poor. And I was quite astounded with her inability to utilize basic English when she is a lecturer at MIT or Tufts, either or both. I always understood that one of the requirements for being a lecturer was being able to speak simple English and to understand it. Her ability to respond to questions from the Committee was so bad that we finally gave up on it.

**SGR.** What was your assessment of Baltimore's testimony?

**Dingell.** Basically an *ad hominem* attack on the Committee.

**SGR.** Do you think he was responsive to the substance of the inquiry?

**Dingell.** No. I think the record gives you an abundantly good answer on that question.

**SGR.** I understand you have other inquiries in the works concerning scientific matters.

**Barrett.** We're interested in how NIH decides to award its grants, how it gives out its money.

**Dingell.** It's not that we're opposed to money for science. Over the years, I've spent an awful lot of time supporting NIH. But if they do not function with appropriate and proper integrity and openness, they will be jeopardizing something which is extremely important, and that's governmental support. If public confidence is not maintained, their ability to receive significant support from the federal government is going to diminish. They've got to develop the ability to distinguish between good projects which should be supported by the public and less desirable projects.

**SGR.** NIH employs a very elaborate review system.

**Dingell.** We saw it at work in the case of O'Toole and Imanishi-Kari.

**SGR.** I was referring to the process for the selection of projects.

**Dingell.** If they do the one so poorly, how are we to assume that they do the other so well?

**SGR.** Do you feel NIH has not been favoring excellence in awarding grants?

**Dingell.** We don't know. We hope so, we think so. But this matter gives us some doubt. You've got to remember, I don't spend time analyzing the substance of what people do. I analyze the procedure under which they do it. We do that in connection with military procurement, federal regulatory activities, and things of that kind. And we usually find that where the process is deficient, the substance of the work product is also deficient.



## US Science Attaches: The Posts and Occupants

Since May 1, 1987, when SGR last listed the Science Attaches and Counselors at US embassies and missions, enough changes have occurred to warrant an update on a resource that scientists often find useful in making their way in foreign lands.

First, however, a repeat of several cautionary notes. The science types rank low in the diplomatic hierarchy and generally possess little influence in their embassies and missions. But they're usually well-connected to the research establishment in the host country or region. Their responsiveness to inquiries varies, depending on workload, personality, and reasonableness of requests. They don't like to be regarded as tour guides or travel agents. They usually can, if they choose, be helpful in making connections with local researchers and with information about collaborative programs.

Add American Embassy to the addresses given (unless Mission is indicated). Army or Fleet Post Offices (APO or FPO), recommended as the preferred routing for mail to US diplomatic posts, are given where available. In embassies to which a Science Attache or Counselor is not posted, a staff member, usually in the economics section, often attends to science-related matters as a part-time duty. Following is the current list of Science Attaches and Counselors, provided to SGR by the State Department.

### Europe

Paris, France: Allen Sessoms, Science Counselor; tel. (331) 42-96-12-02, 42-61-80-75; APO NY, NY 09777

Bonn, West Germany: Edward Malloy, Science Counselor; tel. (49) (228) 339-3390; APO NY, NY 09080

Budapest, Hungary: Thomas Schlenker, Science Attache; tel. (36) 126-450; APO NY, NY 09213

Rome, Italy: Gerald Whitman, Science Counselor; tel. (6) 46741; APO NY, NY 09794

Warsaw, Poland: Gary Waxmonsky, Science Attache; tel. (22) 283041; APO NY, NY 09213

Madrid, Spain: Ishmael Lara, Science Attache; tel. (341) (1) 276-3400/3600, ext. 326; FAX: (341) 564-1652

London, England: James Devine, Science Counselor; tel. (01) 499-9000; FPO NY, NY 09510

Moscow, USSR: Jack Gosnell, Science Attache; tel. (096) 252-24-51; APO NY, NY 09862

Belgrade, Yugoslavia: Robert Day, Science Attache; tel. (11) 645-655; APO NY, NY 09213

### Canada

Ottawa: Francis Kinnelly, Science Counselor; tel. (613) 238-5335; 100 Wellington St., Ottawa K1P 5T1, Canada

### Latin America

Buenos Aires, Argentina: Robert Morris, Science Attache; tel. (1) 774-7611/8811/9911; APO, Miami, Fla. 34034

Brasilia, Brazil: Barbara Tobias, Science Counselor; tel. (61) 223-0120; APO Miami, Fla. 34030

Paseo de la Reforma, Mexico: Roy Simpkins, Science

Counselor; tel. (52) (5) 211-0042; PO Box 3087, Laredo, Texas 78044

### East Asia and Pacific

Beijing, China: William Thomas, Science Counselor; tel. (1) 52-3831; FPO San Francisco, Calif. 96655

Jakarta, Indonesia: Jeffery Lutz, Science Attache; tel. (21) 360-360; APO San Francisco, Calif. 96356

Tokyo, Japan: Richard Getzinger, Science Counselor; tel. (3) 583-7141; APO San Francisco, Calif. 96503

Seoul, South Korea: Jerome Bosken, Science Attache; tel. (2) 732-2601 through 18; APO San Francisco, Ca. 96301

Taipei, Taiwan: Christopher Marut, Science Counselor; tel. (2) 709 2000; AIT Taipei, No. 7, Lane 134; Hsinyi Rd., Section 3, Taipei, Taiwan

### Near East and South Asia

Islamabad, Pakistan: Dona Tarpy, Science Counselor; tel. (92) 51 826-61 through 79; Diplomatic Enclave, Ramna 5, PO Box 11048, Islamabad, Pakistan

New Delhi, India: Peter Heydemann, Science Counselor; tel. (11) 600-651; Shanti Path, Chanakyapuri 110021, New Delhi, India

Tel Aviv, Israel: Charles Lawson; tel. (03) 654-338; APO NY, NY 09672

### International Organizations

US Mission to International Organizations in Vienna: Fred F. McGoldrick, Science Counselor (with responsibility for the International Atomic Energy Agency); tel. (43) 222 51451; Maurice J. Katz, Science Counselor for Nuclear Technology; tel. (43) 222 31-55-11; APO NY, NY 09108

US Mission to the European Communities, Brussels, Belgium: Patricia Haigh, Science Counselor; tel. 322-513-4450; APO NY, NY 09667-1000

US Mission to the Organization for Economic Cooperation and Development, Paris: Robert Carr, Science Counselor; tel. (1) 45-24-74-31; APO NY, NY 09777

## Job Changes & Appointments

**Joshua Lederberg**, President of Rockefeller University since 1978, is scheduled to retire next May, when he reaches age 65. Ads are running inviting suggestions and a search committee has been formed to recommend a successor.

**Michael R. Deland**, Boston-based regional chief of the Environmental Protection Agency, has been selected to chair the Council on Environmental Quality, a once-thriving White House advisory operation that became moribund during the Reagan Administration. The appointment is subject to Senate confirmation.

**Alphonso V. Diaz**, who went to GE last year after a long career at NASA, is returning to the space agency as Deputy Associate Administrator for Space Science and Applications.

**Philip J. Hiltz**, a science reporter at the *Washington Post*, has joined the science staff at the *New York Times* and will be a member of the Washington Bureau.

## A Caution on New Industrial Role for the Pentagon

*There's a new stock subject on the Capitol Hill hearing circuit: should the Pentagon, which has the bankroll, be permitted to become the de facto US agency for industrial research, as recommended by the Defense Science Board and other influential bodies. When the Senate Labor and Human Resources Committee examined the issue recently (SGR, April 15), one witness, Lewis M. Branscomb, former IBM Chief Scientist, told Chairman Edward Kennedy of a relevant study underway at Harvard's Kennedy School of Government, where Branscomb heads the Science, Technology, and Public Policy Program. Kennedy asked for a report. The following is condensed by SGR from Branscomb's response, titled "Leveraging and Supporting the Nation's Dual Use Industrial Base."*

It would be a serious mistake to expect the Department of Defense to conduct surrogate industrial policy for the country. First, its relations with industry have become even more adversarial than those of the civil agencies. Its undoubted capacity for managing high-tech R&D leads it to micromanage, and ill-suits the partnership relationship needed in industrial technology. Finally, until defense can get its own acquisition house in order, including a radical improvement in its own ability to inject incremental improvements in technology in its systems and deploy them in a timely manner, it is hardly in a position to teach commercial industry how to meet international competitive pressure.

On the other hand, there are strategies that could enhance the Defense community's ability to defend the nation more economically while also providing positive stimulation to high-tech commercial industry.

Such strategies will be most useful in so-called dual-use industries—those whose products find application both in defense and in commercial trade. Technologies that have increasingly strategic importance in defense systems are also among the most important in civil high-technology business.

Examples are micro-electronics, computers, telecommunications, software, advanced materials, aeronautical propulsion, communications satellites, airframes, and complex systems engineering. More recently, biotechnology and even industrial synthetic chemistry have renewed military significance. Why this new importance of dual-use industry?

1. While there are major areas of defense technology that are totally unique to defense (a space-based x-ray laser powered by a nuclear explosion has little commercial attraction), the national security increasingly depends on more than destructive weapons: systems for acquiring and analyzing information, for logistical and command control, for rapid deployment, for maintenance and repair. All these are high-priority activities in the civil industrial world, as well.

2. This has happened in part because high-tech commercial industry has outgrown defense industry in the last 25

years. Since 1960, privately funded, commercial R&D has grown (in current dollars) by a factor of 12.78, while US military R&D has grown by only 5.11. Thus, in the US, civil industrial R&D grew 2.5 times as fast as military. In Japan and West Germany, non-military R&D has grown in the same period to a higher fraction of GNP than in the US—by a factor of 1.5.

3. A look at our defense industry shows this same fact: The No. 1 (in total prime contracts) defense contractor in 1987 ranked only No. 35 in the Forbes Sales 500. Among the top 100 defense prime contractors, the defense work of the 10 largest companies amounted to only 2.6 percent of their total sales. The prime contracts of 78 largest contractors averaged only 9.9 percent of their total sales; only 12 had less than 50 percent commercial revenue; only 4 less than 25 percent. In 1987, these 100 prime contractors did \$90 billion in military work for the government (out of \$142 billion) and \$909 billion of total commercial sales, nearly a quarter of the GNP.

One might imagine that their research laboratories, their technology and product development organizations and their manufacturing technology would synergistically support both the trillion-dollar commercial market and the needs of our national security, insuring technological leadership of both.

Yet, when we look at the relationship between these large manufacturing companies and the Defense Department, we find it seriously strained. Most of these companies keep their defense businesses at arm's length from their commercial businesses. They do this for a variety of reasons related to the military's unique way of doing business.

Six directions for improvement are worth exploring:

1. Restore proportionate investment levels in 6.1 and 6.2 [DOD budget categories for fundamental and exploratory research, respectively] to their 1980 levels. If the idea is that defense is critically dependent on the high-tech industrial base, then the Defense Department cannot expect to live off of the research investments of the past, but must reinvest its proportionate share in the common pool of knowledge and human skill. During the major defense buildup of the last eight years, these areas have not grown.

2. Adopt NASA's policy of encouraging contractors to commercialize technologies developed with IR&D funds [independent research and development awards provided to contractors by federal agencies]. NASA gives positive credit for evidence of intent to commercialize. In the Defense Department, the diversion of government funds to private value is forbidden and the policy seems to be one of serious discouragement of overt efforts to take commercial advantage of defense-relevant R&D.

3. Change the military requirements process to encourage bidders to offer modifications to systems requirements if they would bring large economies and/or attractive alter-

(Continued on Page 7)

## PhD Ranks Getting Older, New NSF Study Finds

The American scientific and engineering workforce passed a demographic milestone in 1987, NSF reports, when for the first time, over half of its members were 45 years or older. A decade earlier, only about two-fifths had reached that age. Meanwhile, the annual rate of retirements of scientists and engineers increased from about 0.5 percent between 1977-79 to 0.8 percent during 1985-87. As a result, the proportion of retirees in the PhD population rose from 3.1 percent to 4.8 percent.

These and related data on science and engineering manpower are contained in a new quickie report, *Pace of Retirements of PhD Scientists and Engineers Shows Gradual Rise* (6 pp., no charge; order from: NSF Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4664).

The highest proportion of retirees was in the physical and social sciences and in chemical engineering, the report states, adding an improbable note: "no retirements were reported by PhDs in computer science, a relatively new field."

The report says that a few retirees were under 50, but 87 percent were 60 or older, and 15 percent of recent retirees were 70 or older.

Median annual pay rates for PhD scientists and engineers increased at a real annual rate of 5.5 percent between 1983-87, while the Consumer Price Index rose by 3.4 percent per year. Engineers were paid more than scientists, the report says. "For those with one year or less of experience, the ratio of scientist salary to engineer salary was 75 percent in 1987; for those with 20 to 24 years of work experience, the ratio was 88 percent."

### USIA Showing Scientific Publications

A display of American scientific books and journals will be carried around the world this summer by the United States Information Agency in collaboration with the Council of Engineering and Scientific Society Executives, a Washington-based association of major societies. The publications will be exhibited at some 70 USIA libraries and cultural centers. For additional information: William Hitchcock, American Chemical Society; tel. 202/872-4366.

### In Print

(Continued from Page 8)

**Order from:** American Institute of Aeronautics and Astronautics, 370 L'Enfant Plaza, SW, Washington, DC 20024-2518; tel. 202/646-7404.

**AAAS Publications: Summer 1989** (16 pp., no charge), catalog listing some 75 publications on a variety of subjects issued in recent years by the American Association for the Advancement of Science.

**Order from:** AAAS, Marketing Office, 1333 H St. NW, Washington, DC 20005; tel. 202/326-6446.

## Branscomb: DOD Should Seek More Civilian Goods

(Continued from Page 6)

natives for satisfying military needs. The bidder who might have a civil technology base and set of products of a similar nature to those needed by the military is not encouraged to present a bid that might perform 90 percent of the function for 60 percent of the cost.

4. Review the full range of MILSPECS (military product and component purchase and test specifications) to seek maximum compatibility with commercial engineering standards.

5. Provide significant incentives for the production of "civil off-the-shelf" products for use in military systems.

6. Remove the 1986 procurement act requirement to separate contract competitions for R&D production, in order to ensure that manufacturability is a central feature of systems design.

Under the new rules, the barrier between the R&D phase and the manufacturing phase is raised even higher than it was previously, with the consequence that the designers of new weapons systems have even less incentive than before to take manufacturability into account when they design.

In highly competitive commercial industries, manufacturing technology must be considered very early in exploratory development or competitive costs will never be achieved.

If it is possible to provide incentives for defense manufacturers to invest in highly productive manufacturing facilities and evolve them with each new product development, their capabilities would be much closer to those needed for civilian competitiveness, and the likelihood of "spin-on" from the commercial side of their business would be much enhanced.

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## In Print: NSF Losers, NIH International, DOD, Etc.

*The publications listed are obtainable as indicated—not from SGR.*

**Engineering Research Centers: Status of "Finalist" Proposals Declined by NSF** (Report 89-34, 9 pp., no charge), report of a rare event: an examination of what happened to some of the leading also-rans in a federal grants derby—in this case, NSF's Engineering Research Centers program, which has funded only 18 of 378 applicants over its four-year history. With application costs running into hundreds of thousands of dollars apiece, skeptics question the economic sense of the program, whose awards are only a few million a year per school. However, on the basis of interviews with 49 "highly rated" losers, NSF concludes that many of the rejects benefited from formulating their proposals, planning interdisciplinary programs, and seeking out the required ties with industry. Four ended up with "ERC-like centers," two developed mini-versions of the centers they originally proposed, and six undertook some of the activities proposed in their ERC applications.

Order from: NSF, Office of the Controller, Program Evaluation Staff, 1800 G St. NW, Washington, DC 20550; tel. 202/357-9531.

**National Institutes of Health Annual Report of International Activities: Fiscal Year 1988** (NIH No. 89-62, 177 pp., no charge; supply limited), from the NIH Fogarty International Center for Advanced Study in the Health Sciences, describes and tabulates NIH's many international connections, including the Visiting Program, which supports senior foreign researchers at NIH facilities. The top 10 in numbers of researchers in the program in FY 1988 were Japan (359), China (138), Italy (131), UK (104), India (94), Israel (93), France (70), West Germany (51), Canada (51), and Australia (33).

Order from: Public Affairs Office, Fogarty International Center, Building 16, Room 306, NIH, Bethesda, Md. 20892; tel. 301/496-2075.

**Planning, Managing, and Funding DOD's Technology Base Programs** (SPR 89-319, 49 pp., no charge), from the

Science Policy Research Division of the Congressional Research Service (CRS), Library of Congress, adds to the increasingly heard assertions that the Pentagon has dangerously neglected support of the science and technology that underpin development of advanced weapons systems. The report, by Michael E. Davey, CRS analyst in science and technology, notes that since 1984, the Strategic Defense Initiative has absorbed "almost all of the growth in DOD's S&T programs." It also says the services go their own ways in R&D, with little effort at coordination or direction by the Office of the Secretary of Defense. The report is a follow-up to CRS' *Managing Defense Department Technology Base Programs* (CRS Report No. 88-310), issued in April 1988.

CRS is intermittently sticky about rules that limit distribution of its reports to Congressional members and staffs—who are at liberty to provide copies to outsiders. SGR is now advised that the rules are being followed, and that requests for copies should be channeled to members of Congress, who usually are pleased to perform a favor. Senate: 202/224-3121; House: 202/225-3121.

**Chemical Weapons Convention Bulletin** (quarterly, \$10 per year contribution suggested, 24 pp.), published by the Federation of American Scientists, contains news and analysis of the ongoing Geneva Chemical Weapons Convention and other matters related to CW.

Order from: FAS, 307 Massachusetts Ave. NE, Washington, DC 20002; tel. 202/546-3300.

**AIAA Assessment of Strategic Defense Initiative Technologies** (94 pp., \$29.95 for AIAA members; \$39.95, non-members), report from a workshop sponsored by the American Institute of Aeronautics and Astronautics, says that the problems that must be solved for SDI are being addressed and that "no fundamental obstacles were found that a well-planned technology program could not surmount." The reality, of course, is that SDI is withering from a budget drought and Soviet-American comity, and interest has plummeted in whether it is technologically feasible.

(Continued on Page 7)

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